

AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 3. This sheet, which includes Fig. 3, replaces the original sheet including Fig. 3.

Attached: Replacement Sheet

SUPPORT FOR THE AMENDMENT

This Amendment cancels Claim 2; amends Claims 1 and 22; and amends Fig. 3. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 is found in canceled Claim 2 and in the specification at [0024] and Fig. 1B. Support for Claim 22 is found in the specification at least at [0042]. Support for Fig. 3 is found in the specification at least at [0033]. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1 and 3-39 will be pending in this application. Claims 1 and 22 are independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the courtesies extended to their representative during the January 11, 2006 personal interview.

As discussed at the personal interview, there is a trend in the semiconductor industry towards replacing gates of doped polysilicon with metal gates. Candidate metal gates include Ni-containing materials. However, conventional plasma etching of Ni-containing materials using halogen-based chemistry is difficult. Specification at [0003]-[0005].

The present invention provides a method of plasma etching Ni-containing materials using a plasma formed from a carbonyl gas (e.g., CO, CO₂) and a hydrogen halide (HX).

Claims 1, 15, 22-26 and 29-39 are rejected under 35 U.S.C. §102(b) over U.S. Patent No. 6,156,666 ("Tokushima"). In addition, Claims 1-2, 4, 22 and 29-39 are rejected under 35 U.S.C. §102(b) over JP 02-088782 ("Hitachi"). Claims 1, 15, 22-23 and 25 are rejected under 35 U.S.C. §102(b) over the Derwent abstract 1976-26963X of JP 51022637 ("Fujitsu").

Claims 1, 12, 22-27 and 29-39 are rejected under 35 U.S.C. §102(b) over JP 2000322710 ("Mashita"). Claims 1, 13-15, 22 and 29-39 are rejected under 35 U.S.C. §102(a) over U.S. Patent No. 6,225,202 ("Gupta"). Claims 3, 5, 7, 9, 11, 13-16, 18, 20 and 23-28 are rejected under 35 U.S.C. §103(a) over Hitachi. Claims 6, 8, 10, 17, 19 and 21 are rejected under 35 U.S.C. §103(a) over Hitachi over Fujitsu. Claims 23-28 are rejected under 35 U.S.C. §103(a) over Gupta.

Claim 2 is rejected only over Hitachi. Claim 2 is canceled and incorporated into independent Claim 1.

As shown in the attached three different English-language abstracts, Hitachi discloses a cermet substrate 3 containing TiC, Co, Ni and WC. The term "cermet" can be defined as "a material consisting of processed ceramic particles bonded with metal". The American Heritage College Dictionary, 3d edition, page 229 (copy attached). Hitachi discloses that the Ni containing binder on the surface of the cermet substrate 3 is etched by a plasma containing at least one of carbon monoxide, water and gaseous hydrogen halides prior to depositing a diamond film.

However, Hitachi fails to suggest the independent Claim 1 limitations of "providing a nickel-containing layer overlying a substrate; ... etching said nickel-containing layer by exposing said nickel-containing layer to said plasma, wherein said process gas ... etches completely through a portion of said nickel-containing layer to said substrate".

Thus, the prior art rejection of independent Claim 1 should be withdrawn.

Tokoshima discloses a method of dry etching nickel film by means of plasma of an etching gas, including at least one of CO and CO₂, in an apparatus containing a magnetic field generator for magnetically capturing nickel. Tokoshima at abstract; column 5, lines 8-9. Tokoshima discloses that the magnetic field generator is a permanent magnet having N and S poles. Tokoshima at column 11, lines 57-58.

However, Tokoshima, and the other cited prior art, fails to suggest the limitation of independent Claim 22 of a "plasma processing system comprising: a process chamber; a gas injection system ...; a plasma source ...; a substrate holder ...; a mechanically or electrically *rotating* DC magnetic field system; and a controller that controls said plasma processing system and said magnetic field system".

Thus, the prior art rejection of independent Claim 22 should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Steven P. Weihrouch
Registration No. 32,829
Attorney of Record



Corwin P. Umbach, Ph.D.
Registration No. 40,211

Attached:

Replacement Sheet for Fig. 3
Three different English-language abstracts of JP 02-088782 ("Hitachi")
The American Heritage College Dictionary, 3d edition, page 229

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)
CPU/rac

n. The commander of a
Ofr. < Lat. *centurio*,
ndred. See CENTURY.]
A period of 100 years.
00 years before or since
1. A Roman army unit
One of the 193 Roman
[Lat. *centuria*, a group
ce *dek'm*.] — *cen-tu'*

ficer.
freeman of the lowest

ies of edible mushroom
cep, tree trunk, cep <
arker.]
and the head or anterior

A headache.
uting to the head. 2. Lo-
iphalique < Lat. *ceph-*
ald. See ghebh-el-*

d or number of heads.
imum width of the head
100.

in (kēf'-) *n.* Any of a
iostatic properties and
e brain and spinal cord.
An evolutionary trend
alization of neural and
r region of the body.
phalothorax. [NLat. <
hebb-el-*,

āt') *n.* Any of various
hyllum Cephalochorda.
[< NLat. *Cephalochor-*
rdata, chordate phy-
r'date' *adj.*

A device for measuring

Scientific measurement
lō-mēt'rik) *adj.*
a) also Ke-fal-ll-ni-a
nian Is. off the W coast

of various marine mol-
as the squid, having a
acles, and often an ink
< NLat. *Cephalopoda*,
id.] — *ceph'a-lo-pod'*
-don) *n.* & *adj.*

spor'-) *n.* Any of vari-
ally derived from the
[NLat. *Cephalospori-*
pore; see *spore*] + -in-
-thor'-) *n.* The ante-
ustaceans, consisting of

id of head or number of
s < *kephalē*, head. See

the head: *microcephaly*.
a class of intrinsically
lar periods of light pul-

A constellation in the
a and Draco. [Lat. *Cē-*
or waxlike. [Lat. *cēra*.

of E Indonesia in the
ng on the Ceram Sea. a

[*CERAM*(ic) + *AL*(loy).]
ious hard, brittle, heat-
le by shaping and then
clay, at a high temper-
earthenware. b. *ceram-*
r technique of making
— *keramikos*, of pottery
— *ce-ram'ic* *adj.* — *ce-*

. Any of several venom-
ing hornlike projections
< Gk. *kerasīēs*, horned

fat- or wax-based solid.
id to the skin. [Lat. *cē-*

ratum < *cērātus*, p.part. of *cērāre*, to cover with wax < *cēra*,
wax; akin to Gk. *kēros*.]

cer'at-ed (sēr'ā'tid) *adj.* 1. Coated with wax or resin. 2. Hav-
ing a cere: a *cerated* beak. [< Lat. *cērātus*. See *CERATE*.]

cerato- *pref.* Var. of *kerato-*.

cer'at-o-dus (sō-rā'tō-das) *n., pl. -dus-es*. 1. Any of various
extinct lungfishes of the genus *Ceratodus*, of the Triassic and
Cretaceous periods. 2. See *barramunda*. [NLat. *Ceratodus*,
genus name: Gk. *keras*, *kerat-*, horn; see *ker-1** + Gk.
odous, tooth; see *dent-**.]

cer'a-toid (sēr'ā-toid') *adj.* Similar to a horn; hornlike.

cer'ber-o-us (sūr'bōr-as) *n.* Gk. & Rom. Myth. A three-headed
dog guarding Hades. — *Cer'ber-e'an* (sūr'bā-rē'an) *adj.*

cer'car-i-a (sōr-kār'ē-ā) *n., pl. -i-ae* (ē-ē') or -i-as. The par-
asitic larva of a trematode worm, having a tail that disappears
in the adult stage. [NLat. < Gk. *kerkos*, tail + *-aria*, fem. of
Lat. *arius*, -ary.] — *cer-car'i-al* *adj.*

cer'cus (sūr'kas, kēr'ē') *n., pl. cer-cl* (sūr'sī, -kī, kēr'kē). Ei-
ther of a pair of terminal, dorsolateral sensory appendages of
certain insects. [NLat. < Gk. *kerkos*, tail.]

cer'el (sēr'ēl) *tr.v.* *cered, cer-ing, ceres*. To wrap in or as if in
cercloth. [ME *ceren, ciren* < Ofr. *cier*, to cover with wax <
Lat. *cērāre*. See *CERATE*.]

cer'e (sēr') *n.* A fleshy or waxlike swelling at the base of the
upper part of the beak in certain birds. [ME *sere* < Ofr. *cire*
< Med.Lat. *cēra* < Lat., wax. See *CERATE*.] — *cered* *adj.*

cer'e-al (sēr'ē-āl) *n.* 1. a. A grass such as corn, the starchy
grains of which are used as food. b. The grain of such a grass.
2. Any of several other plants or their edible seed or fruit,
such as grain amaranth. 3. A food prepared from a cereal
plant, esp. a breakfast food made from commercially process-
ed grain. [< Lat. *cerēdis*, of grain < *Cerēs*, *Ceres*. See
*ker-2**.] — *ce-re'al* *adj.*

cer'eal *leaf, beetle* *n.* An Old World beetle (*Oulema melano-*
pis) now found in the United States, where it is a grain pest.

cer'e-bel-lum (sēr'ē-bēl'um) *n., pl. -bel-lums* or -bel-la
(-bēl'ā). The trilobed structure of the brain, posterior to the
pons and medulla oblongata and inferior to the occipital lobes
of the cerebral hemispheres and responsible for the regulation
and coordination of complex voluntary muscular movement
and for posture and balance. [Med.Lat. < Lat., dim. of *cere-*
brum, brain. See *ker-1**.] — *cer'e-be'l'ar* (-bēl'ār) *adj.*

cer'e-brā (sēr'ē-brā, sō-rē'brā) *n.* Pl. of *cerebrum*.

cer'e-bral (sēr'ē-brāl, sō-rē'brāl) *adj.* 1. Of or relating to
the brain or cerebrum. 2. Appealing to or requiring the use of the
intellect; intellectual. — *cer'e-bral'ly* *adv.*

cerebral cortex *n.* The extensive outer layer of gray matter of
the cerebral hemispheres, largely responsible for higher brain
functions; including sensation, reasoning, and memory.

cerebral hemisphere *n.* Either of the symmetrical halves of the
cerebrum; divided by the longitudinal cerebral fissure.

cerebral palsy *n.* A disorder, usually caused by brain damage oc-
curring at or before birth and marked by muscular impair-
ment. — *cer'e-bral-pal'sied* (sēr'ē-brāl-pōl'zēd, sō-rē'brāl) *adj.*

cer'e-brate (sēr'ē-brāt') *intr.v.* *-brat-ed, -brat-ing, -brates*.
To use the power of reason; think. [Back-formation < *cere-*
bration, thinking < Lat. *cerebrum*, brain. See *CEREBRUM*.]

— *cer'e-brat'ion* *n.*

cerebro- or *cerebr-* *pref.* Brain; cerebrum: *cerebroside*. [<
CEREBRUM.]

cer'e-bro-side (sēr'ē-brō-sid', sō-rē'brō-sid') *n.* Any of various lipid
compounds containing glucose or galactose and glucose and
found in nerve tissue. [CEREBR(O) + -os(e)² + -IDE.]

cer'e-bro-spi-nal (sēr'ē-brō-spi-nāl, sō-rē'brō-spi-nāl) *adj.* Of or
relating to the brain and spinal cord.

cerebrospinal fluid *n.* The serulike fluid that circulates
through the brain, the cavity of the spinal cord, and the sub-
arachnoid space, functioning in shock absorption.

cerebrospinal meningitis *n.* Inflammation of the meninges of
both the brain and the spinal cord.

cer'e-brō-vas-cu-lar (sēr'ē-brō-vās'kyō-lār, sō-rē'brō-vās-cu-lār) *adj.*
Of or relating to the blood vessels that supply the brain.

cer'e-brum (sēr'ē-brām, sō-rē'brām) *n., pl. -brums* or -bra (-brā).
The large rounded structure of the brain occupying most of
the cranial cavity, divided into two cerebral hemispheres that
are joined at the bottom by the corpus callosum and control-
ling and integrating motor, sensory, and higher mental func-
tions. [Lat., brain. See *ker-1**.]

cer'e-cloth (sēr'ē-clōth', -klōth') *n.* Cloth coated with wax, for-
merly used for wrapping the dead.

cer'e-ment (sēr'ē-mēnt, sēr'mēnt) *n.* 1. Cerecloth. 2. A burial
garment. Often used in the plural.

cer'e-mo-ni-al (sēr'ē-mō-nē-āl) *adj.* 1. Of, appropriate to,
or marked by ceremony; formal or ritual. 2. Involved or used
in ceremonies. — *n.* 1. A set of ceremonies for an occasion;
a ritual. 2. A ceremony or rite. — *cer'e-mo-ni-al-ism* *n.*
— *cer'e-mo-ni-al-ist* *n.* — *cer'e-mo-ni-al-ly* *adv.*

cer'e-mo-ni-ous (sēr'ē-mō-nē-ās) *adj.* 1. Strictly observant
of or devoted to ceremony, ritual, or etiquette; punctilious.
2. a. Characterized by ceremony. b. In accord with prescribed
or customary usage; rigidly formal. — *cer'e-mo-ni-ous-ly*
adv. — *cer'e-mo-ni-ous-ness* *n.*

cer'e-mo-ny (sēr'ē-mō-nē) *n., pl. -nies*. 1. A formal act or set
of acts performed as prescribed by ritual or custom. 2. A
conventional social gesture or act of courtesy. 3. A formal act
without intrinsic purpose; an empty form. 4. Strict obser-
vance of formalities or etiquette. [ME *ceremonie* < Lat. *cae-*
rimonia, religious rite.]

Ce-ren-kov (chā-rēng'kōf, -kōf, chī-ryin-kōf') *n.* Pavel
Aleksievich. See Pavel Aleksievich Cherenkov.

Ce-ren-kov effect also *Che-ren-kov effect* (chā-rēng'kōf,
-kōf) *n.* The emission of light by a charged particle passing
through a transparent nonconducting medium at a speed
greater than the speed of light in that medium. [After Pavel
Aleksievich Cherenkov.]

Ce-res (sēr'ēz) *n.* 1. Rom. Myth. The goddess of agriculture.
2. The largest asteroid and the first discovered, orbiting be-
tween Mars and Saturn. [Lat. *Cerēs*, genus name < Lat.
cēreus, candle (< its shape) < *cēra*, wax. See *CERATE*.]

ce-re-us (sēr'ē-as) *n.* Any of several cacti of the genus *Cereus*
or closely related genera. [NLat. *Cēreus*, genus name < Lat.
cēreus, candle (< its shape) < *cēra*, wax. See *CERATE*.]

ce-ric (sēr'ik, sēr'ē-ē) *adj.* Of, relating to, or containing cerium,
esp. with valence 4. [CER(IUM) + -IC.]

ceric oxide *n.* A pale yellow-white powder, CeO₂, used in ce-
ramics, to polish glass, and to sensitize photosensitive glass.

cer'iph (sēr'if) *n.* Chiefly British. Var. of *seriff*.

ce-rise (sō-rēs', -rēs') *n.* Color. A deep to vivid purplish red.
[Fr. < Ofr., cherry. See *CHERRY*.] — *ce-rise'* *adj.*

ce-ri-um (sēr'ē-əm) *n.* Symbol Ce A lustrous, malleable met-
allic rare-earth element that occurs chiefly in the minerals
monazite and bastnaesite, exists in four allotropic states, and
is used in lighter flint alloys. Atomic number 58; atomic
weight 140.12; melting point 795°C; boiling point 3,468°C;
specific gravity 6.67 to 8.23; valence 3, 4. See table at ele-
ment. [CER(ES) + -IUM.]

cer-met (sūr'mēt') *n.* A material consisting of processed ce-
ramic particles bonded with metal and used in high-strength
and high-temperature applications. [CER(AMIC) + MET(AL).]

cer-nu-ous (sūr'nyōō-s) *adj.* Bot. Nodding; drooping. [<
Lat. *cernuus*, bowing forward.]

ce-ro (sēr'ō, sēr'ō) *n., pl. ce-ros* or *cero*. An edible fish
(*Scomberomorus regalis*) of western Atlantic waters having
silvery sides and a dark blue back. [Alteration of Sp. *sierra*,
saw, sawfish. See *SIERRA*.]

ce-ro-tic acid (sō-rō'tik, -rōt'ik) *n.* A fatty acid,
CH₃(CH₂)₂₂COOH, occurring in waxes. [< Lat. *cērotum*,
wax plaster, Gk. *kērotōn*, ult. < *kēros*, wax.]

ce-ro-type (sēr'ā-tip', sēr'ā-) *n.* The process of preparing a
printing surface for electrotyping by first engraving on a wax-
coated metal plate. [Gk. *kēros*, wax + *TYPE*.]

ce-rous (sēr'ās) *adj.* Of, relating to, or containing cerium, esp.
with valence 3. [CER(IUM) + -OUS.]

Cer-ri-tos (sō-rē'tas) *n.* A city of S CA, a suburb of Los Angeles.
Pop. 53,240.

Ce-ro Gor-do (sēr'ō gōr'dō) *n.* A mountain pass of SE Mexico
between Veracruz and Mexico City; site of a U.S. victory
(1847) in the Mexican War.

cert. abbr. 1. Certificate; certification. 2. Certified.

cer-tain (sūr'tn) *adj.* 1. Definite; fixed. 2. Sure to come or
happen; inevitable. 3. Established beyond doubt or question;
indisputable. 4. Capable of being relied on; dependable.
5. Having or showing confidence; assured. 6. a. Not specified
or identified but assumed to be known. b. Named but not
known or previously mentioned. 7. Perceptible; noticeable.
8. Not great; calculable. — *pron.* An indefinite but limited
number; some. — *idiom.* For certain. Without doubt; defi-
nitely. [ME < Ofr. < VLat. **certānus* < Lat. *certus*, p-part.
of *cernere*, to determine. See *Krei-**.]

Usage Note: Although *certain* appears to be an absolute
term, it is frequently qualified by adverbs, as in *fairly certain*.
In an earlier survey a majority of the Usage Panel accepted the
construction *Nothing could be more certain*.

cer-tain-ly (sūr'tn-lē) *adv.* 1. Undoubtedly; definitely. 2. By
all means; of course. 3. Surely. *They certainly work hard*.

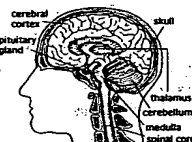
cer-tain-ty (sūr'tn-tē) *n., pl. -ties*. 1. The fact, quality, or
state of being certain: *the certainty of death*. 2. Something
that is clearly established or assured.

Syns: *certainty, certitude, assurance, conviction*. These
nouns mean freedom from doubt. *Certainty* implies a thor-
ough consideration of evidence: "*Jealousy . . . ends as soon as*
we pass from suspicion to certainty" (La Rochefoucauld).
Certitude is based more on personal belief than on objective
facts: "*Certitude is not the test of certainty*" (Oliver Wendell
Holmes, Jr.). *Assurance* is a feeling of confidence resulting
from subjective experience: "*There is no such thing as abso-*
lute certainty" (John Stuart Mill). *Conviction* arises from the
vanquishing of doubt: "*The supreme happiness of life is the*
conviction that we are loved" (Victor Hugo).

cer'tes (sūr'tēz, sūr'ts) *adv.* Archaic. Certainly; truly. [ME <
Ofr. (a) *certes*, perh. < Lat. *ad certās* or < VLat. **certānus*,
both < Lat. *certus*, certain. See *CERTAIN*.]

certif. abbr. Certificate.

cer-ti-fi-a-ble (sūr'tā-fi'ā-bal) *adj.* 1. That can be certified.
2. Fit to be declared insane. — *cer-ti-fi-a-bly* *adv.*



cerebellum



Ceres

ā pat	oi boy
ā pay	ou out
ā care	ōō took
ā father	ōō boot
ē pet	ū cut
ē be	ūr urge
ī pit	th thin
ī ple	th this
īr pler	hw which
ō pot	zh vision
ō toe	ā about
ō paw	item

Stress marks:

' (primary);

' (secondary), as in

dictionary (dik'shā-nēr'ē)

Words are included in this Dictionary on the basis of their usage. Words that are known to have current trademark registrations are shown with an initial capital and are also identified as trademarks. No investigation has been made of common-law trademark rights in any word, because such investigation is impracticable. The inclusion of any word in this Dictionary is not, however, an expression of the Publisher's opinion as to whether or not it is subject to proprietary rights. Indeed, no definition in this Dictionary is to be regarded as affecting the validity of any trademark.

American Heritage® and the eagle logo are registered trademarks of Forbes Inc. Their use is pursuant to a license agreement with Forbes Inc.

Copyright © 1997, 1993 by Houghton Mifflin Company.
All rights reserved.

No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system without the prior written permission of Houghton Mifflin Company unless such copying is expressly permitted by federal copyright law. Address inquiries to Reference Permissions, Houghton Mifflin Company, 222 Berkeley Street, Boston MA 02116.

0-395-67161-2 (UPC)

Library of Congress Cataloging-in-Publication Data

The American heritage college dictionary. —3rd ed.

p. cm.
ISBN 0-395-66917-0 (plain edge). —ISBN 0-395-44638-4 (thumb edge). —ISBN 0-395-66918-9 (deluxe binding).

1. English language—Dictionaries. 2. Americanisms.
PE1628.A6227 1993

423—dc20

92-42124
CIP

Manufactured in the United States of America

For information about this and other Houghton Mifflin trade and reference books and multimedia products, visit The Bookstore at Houghton Mifflin on the World Wide Web at <http://www.hmco.com/trade/>.

BEST AVAILABLE COPY